Mathematics Crosswalk
Common Core State Standards to
Connecticut State Standards

Grades 9-12

Mathematics Standards for High School

The high school standards specify the mathematics that all students should study in order to be college and career ready. Additional mathematics that students should learn in order to take advanced courses such as calculus, advanced statistics, or discrete mathematics is indicated by (+), as in this example:

(+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers).

All standards without a (+) symbol should be in the common mathematics curriculum for all college and career ready students. Standards without a (+) symbol may also appear in courses intended for all students. The high school standards are listed in conceptual categories:

- Number and Quantity
- Algebra
- Functions
- Modeling
- Geometry
- Statistics and Probability

Conceptual categories portray a coherent view of high school mathematics; a student's work with functions, for example, crosses a number of traditional course boundaries, potentially up through and including calculus.
Modeling is best interpreted not as a collection of isolated topics but in relation to other standards. Making mathematical models is a *Standard for Mathematical Practice*, and specific modeling standards appear throughout the high school standards indicated by an asterisk (*). The asterisk sometimes appears on the heading for a group of standards; in that case, it should be understood to apply to all standards in that group.

Content for the Grades 9-12 Connecticut standards is addressed through a grade band divided into 9-12 Core (C) and 9-12 Extended (E). The 9-12 Core specifies the expectations that could potentially be tested on CAPT as well as those concepts and skills **all** students should know and be able to do prior to high school graduation. Content for Grades 9-12 Extended represents concepts that students could encounter in a variety of typical high school courses beginning with Algebra II and beyond.

Number and Quantity			
The Real Number System			
Extend the properties of exponents to rational exponents.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.N.RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define $5^{(1/3)}$ to be the cube root of 5 because we want $[5^{(1/3)}]^3 = 5^{[(1/3) \times 3]}$ to hold, so $[5^{(1/3)}]^3$ must equal 5.	**CT.9-12.2.C.1.a.(2)** Select and use an appropriate form of number (integer, fraction, decimal, ratio, percent, exponential, scientific notation, irrational) to solve practical problems involving order, magnitude, measures, labels, locations and scales. **CT.9-12.2.E.1.a.(4)** Judge the effects of computations with powers and roots on the magnitude of results. **CT.9-12.2.E.1.a.(2)** Select and use an appropriate form of number (integer, fraction, decimal, ratio, percent, exponential, scientific notation, irrational, complex) to solve practical problems involving order, magnitude, measures, labels, locations and scales. **CT.9-12.2.C.1.a** Extend the understanding of number to include integers, rational numbers and real numbers.		Rational exponents are not specifically addressed in the CT standards and are not assessed on CAPT.

Number and Quantity			
The Real Number System			
Extend the properties of exponents to rational exponents.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.	**CT.9-12.2.E.1.a.(4)** Judge the effects of computations with powers and roots on the magnitude of results. **CT.9-12.2.E.1.a.(2)** Select and use an appropriate form of number (integer, fraction, decimal, ratio, percent, exponential, scientific notation, irrational, complex) to solve practical problems involving order, magnitude, measures, labels, locations and scales. **CT.9-12.2.C.1.a.(2)** Select and use an appropriate form of number (integer, fraction, decimal, ratio, percent, exponential, scientific notation, irrational) to solve practical problems involving order, magnitude, measures, labels, locations and scales. **CT.9-12.2.C.1.a** Extend the understanding of number to include integers, rational numbers and real numbers.		Radical and rational exponents are not specifically addressed in the CT standards and are not assessed on CAPT.

Number and Quantity			
The Real Number System			
Use properties of rational and irrational numbers.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.N.RN.3 Explain why the sum or product of rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.	**CT.9-12.2.C.1.a** Extend the understanding of number to include integers, rational numbers and real numbers. **CT.9-12.2.E.1.a.(3)** Justify mathematical procedures and determine how they apply to invented operations using field properties (closure, associative, commutative, distributive, identity and inverse).	**CT.9-12.2.C.1.a** Extend the understanding of number to include integers, rational numbers and real numbers.	CT standards include other properties in the same standard. CCSS focuses primarily on property of closure within number systems.

Number and Quantity			
Quantities*			
Reason quantitatively and use units to solve problems.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.N.Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	**CT.9-12.2.C.2.a.(3)** Develop and use a variety of strategies to estimate values of formulas, functions and roots; to recognize the limitations of estimation; and to judge the implications of the results. **CT.9-12.2.C.2.a.(1)** Select and use appropriate methods for computing to solve problems in a variety of contexts. **CT.9-12.3.C.3.a.(1)** Select appropriate units, scales, degree of precision, and strategies to determine length, angle measure, perimeter, circumference and area of plane geometric figures. **CT.9-12.1.C.2.a.(4)** Evaluate and interpret the graphs of linear, exponential and polynomial functions.	**CT.9-12.2.C.2.a.(1)** Select and use appropriate methods for computing to solve problems in a variety of contexts. **CT.9-12.3.C.3.a.(1)** Select appropriate units, scales, degree of precision, and strategies to determine length, angle measure, perimeter, circumference and area of plane geometric figures.	

Number and Quantity			
Quantities*			
Reason quantitatively and use units to solve problems.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.	**CT.9-12.2.C.1.a.(2)** Select and use an appropriate form of number (integer, fraction, decimal, ratio, percent, exponential, scientific notation, irrational) to solve practical problems involving order, magnitude, measures, labels, locations and scales.	**CT.9-12.2.C.1.a.(2)** Select and use an appropriate form of number (integer, fraction, decimal, ratio, percent, exponential, scientific notation, irrational) to solve practical problems involving order, magnitude, measures, labels, locations and scales.	CT standard is more descriptive than CCSS standard.
CC.9-12.N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	**CT.9-12.2.C.2.a.(3)** Develop and use a variety of strategies to estimate values of formulas, functions and roots; to recognize the limitations of estimation; and to judge the implications of the results.	**CT.9-12.2.C.2.a.(3)** Develop and use a variety of strategies to estimate values of formulas, functions and roots; to recognize the limitations of estimation; and to judge the implications of the results.	Both standards address limitations; CCSS with respect to measurement and CT standard with respect to estimation across multiple topics.

Number and Quantity			
The Complex Number System			
Perform arithmetic operations with complex numbers			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.N.CN.1 Know there is a complex number *i* such that $i^2 = \sqrt{-1}$, and every complex number has the form $a + bi$ with *a* and *b* real.	**CT.9-12.2.E.1**.a Extend the understanding of number to include the set of complex numbers.		CCSS is more specific than CT standards.
CC.9-12.N.CN.2: Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	**CT.9-12.2.E.2.a.(2)** Perform operations with complex numbers, matrices, determinants and logarithms.		CCSS is more specific than the CT standards.
CC.9-12.N.CN.3 (+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.	**CT.9-12.2.E.2.a.(2)** Perform operations with complex numbers, matrices, determinants and logarithms.		CCSS is more specific than the CT standards.

Number and Quantity			
The Complex Number System			
Represent complex numbers and their operations on the complex plane:			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.N.CN.4 (+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.	**CC.9-12.N.CN.4 (+)** Represent complex numbers and their operations on the complex plane: Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.		CT standard is missing why polar/complex are equivalent. Complex numbers are not assessed on CAPT.
CC.9-12.N.CN.5 (+). Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. For example, $(-1 \pm \sqrt{3}i)^3 = 8$ because $(-1 \pm \sqrt{3}i)$ has modulus 2 and argument 120°.	**CT.9-12.2.E.1.a.(1)** Compare and contrast the properties of numbers and number systems, including rational, real and complex numbers. **CT.9-12.2.E.2.a.(2)** Perform operations with complex numbers, matrices, determinants and logarithms.		CCSS is more specific than CT standards.
CC.9-12.N.CN.6 (+) Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.	No Match		

Number and Quantity			
The Complex Number System			
Use complex numbers in polynomial identities and equations			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.N.CN.7 Solve quadratic equations with real coefficients that have complex solutions.	**CC.9-12.N.CN.7** Use complex numbers in polynomial identities and equations: Solve quadratic equations with real coefficients that have complex solutions.		CT standard does not explicitly include complex solutions. Complex numbers are not assessed on CAPT.
CC.9-12.N.CN.8 (+) Extend polynomial identities to the complex numbers. For example, rewrite $x^2 + 4$ as $(x + 2i)(x - 2i)$.	No Match		
CC.9-12.N.CN.9 (+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.	No Match		

Number and Quantity			
Vector and Matrix Quantities			
Represent and model with vector quantities.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.N.VM.1 (+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., *v*, |*v*|, ||*v*||, *v*).	**CT.9-12.2.E.2.a.(1)** Recognize vectors and matrices as systems that have some, but not all, of the properties of real numbers.		CCSS (1-5) elaborate on a single CT standard.
CC.9-12.N.VM.2 (+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.	**CT.9-12.2.E.2.a.(1)** Recognize vectors and matrices as systems that have some, but not all, of the properties of real numbers.		
CC.9-12.N.VM.3 (+) Solve problems involving velocity and other quantities that can be represented by vectors.	**CT.9-12.2.E.2.a.(1)** Recognize vectors and matrices as systems that have some, but not all, of the properties of real numbers.		

Number and Quantity			
Vector and Matrix Quantities			
Perform operations on vectors.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.N.VM.4 (+) Add and subtract vectors.	**CT.9-12.2.E.2.a.(1)** Recognize vectors and matrices as systems that have some, but not all, of the properties of real numbers.		
CC.9-12.N.VM.4a (+) Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes.	**CT.9-12.2.E.2.a.(1)** Recognize vectors and matrices as systems that have some, but not all, of the properties of real numbers.		
CC.9-12.N.VM.4b (+) Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum.	**CT.9-12.2.E.2.a.(1)** Recognize vectors and matrices as systems that have some, but not all, of the properties of real numbers.		
CC.9-12.N.VM.4c (+) Understand vector subtraction $v - w$ as $v + (-w)$, where $(-w)$ is the additive inverse of w, with the same magnitude as w and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.	**CT.9-12.2.E.2.a.(1)** Recognize vectors and matrices as systems that have some, but not all, of the properties of real numbers.		

Number and Quantity			
Vector and Matrix Quantities			
Perform operations on vectors:			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.N.VM.5 (+) Multiply a vector by a scalar.	**CT.9-12.2.E.2.a.(1)** Recognize vectors and matrices as systems that have some, but not all, of the properties of real numbers.		
CC.9-12.N.VM.5a (+) Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(vx, vy) = (cvx, cvy)$.	**CT.9-12.2.E.2.a.(1)** Recognize vectors and matrices as systems that have some, but not all, of the properties of real numbers.		
CC.9-12.N.VM.5b (+) Compute the magnitude of a scalar multiple cv using $\|\|cv\|\| = \|c\|v$. Compute the direction of cv knowing that when $\|c\|v \neq 0$, the direction of cv is either along v (for $c > 0$) or against v (for $c < 0$).	**CT.9-12.2.E.2.a.(1)** Recognize vectors and matrices as systems that have some, but not all, of the properties of real numbers.		

Number and Quantity			
Vector and Matrix Quantities			
Perform operations on matrices and use matrices in applications:			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.N.VM.6 (+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.	**CT.9-12.2.E.2.a.(2)** Perform operations with complex numbers, matrices, determinants and logarithms.		CCSS (6-8) elaborate on a single CT standard.
CC.9-12.N.VM.7 (+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.	**CT.9-12.2.E.2.a.(2)** Perform operations with complex numbers, matrices, determinants and logarithms.		
CC.9-12.N.VM.8 (+) Add, subtract, and multiply matrices of appropriate dimensions.	**CT.9-12.2.E.2.a.(2)** Perform operations with complex numbers, matrices, determinants and logarithms.		
CC.9-12.N.VM.9 (+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.	**CT.9-12.1.E.3.a.(3)** Use logarithms, vectors and matrices to solve problems.CT.9-12.2.E.2.a.(1) Recognize vectors and matrices as systems that have some, but not all, of the properties of real numbers.		
CC.9-12.N.VM.10 (+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.	**CT.9-12.2.E.2.a.(1)** Recognize vectors and matrices as systems that have some, but not all, of the properties of real numbers.		

Number and Quantity			
Vector and Matrix Quantities			
Perform operations on matrices and use matrices in applications:			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.N.VM.11 (+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.	**CT.9-12.2.E.2.a.(1)** Recognize vectors and matrices as systems that have some, but not all, of the properties of real numbers. **CT.9-12.2.E.2.a.(2)** Perform operations with complex numbers, matrices, determinants and logarithms.		
CC.9-12.N.VM.12 (+) Work with 2×2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area.	**CT.9-12.3.E.2.a.(3)** Represent translations, reflections, rotations and dilations of plane figures using sketches, coordinates, vectors, function notation and matrices to examine the effects of transformations and their composites and to solve related geometric problems.		

Algebra			
Seeing Structure in Expressions			
Interpret the structure of expressions			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.A.SSE.1 Interpret expressions that represent a quantity in terms of its context.*	**CT.6.1.2.4** Write expressions, formulas, equations or inequalities using symbols or variables to denote a pattern or represent a contextual situation. **CT.9-CT.9-12.1.C.2.a.(3)** Recognize and explain the meaning of the slope and x- and y-intercepts as they relate to a context, graph, table or equation.	**CT.9-12.1.C.2.a.(3)** Recognize and explain the meaning of the slope and *x*- and *y*-intercepts as they relate to a context, graph, table or equation.	CT 9-12 standards focus more on equations than expressions. The CT Grades 6-8 standards focus more on expressions.
CC.9-12.A.SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients.	**CT.7.1.2.4** Write expressions, formulas, equations or inequalities using variables to represent mathematical relationships and solve problems. **CT.9-12.1.C.2.a.(3)** Recognize and explain the meaning of the slope and x- and y-intercepts as they relate to a context, graph, table or equation.	**CT.9-12.1.C.2.a.(3)** Recognize and explain the meaning of the slope and *x*- and *y*-intercepts as they relate to a context, graph, table or equation.	CT 9-12 standards focus more on equations than expressions. The CT Grades 6-8 standards focus more on expressions.
CC.9-12.A.SSE.1b Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret $P(1+r)^n$ as the product of *P* and a factor not depending on *P*.	**CT.7.1.2.4** Write expressions, formulas, equations or inequalities using variables to represent mathematical relationships and solve problems. **CT.9-12.1.C.3.a.(1)** Model and solve problems with linear, quadratic and absolute value equations and linear inequalities.	**CT.9-12.1.C.3.a.(1)** Model and solve problems with linear, quadratic and absolute value equations and linear inequalities.	CT standards do not emphasize examining the parts of an expression.

Algebra			
Seeing Structure in Expressions			
Interpret the structure of expressions			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.A.SSE.2 Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.	**CT.9-12.1.C.3.a.(2)** Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.	**CT.9-12.1.C.3.a.(2)** Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.	CCSS focuses on only using the structure of an expression to determine equivalence.
Write expressions in equivalent forms to solve problems			
CC.9-12.A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.	**CT.9-12.1.C.3.a.(2)** Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.	**CT.9-12.1.C.3.a.(2)** Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.	CT 9-12 standards focus on equations only. Expressions are included in the Grades 6-8 CT standards.
CC.9-12.A.SSE.3a Factor a quadratic expression to reveal the zeros of the function it defines.	**CT.9-12.1.C.3.a.(1)** Model and solve problems with linear, quadratic and absolute value equations and linear inequalities. **CT.9-12.1.C.3.a.(2)** Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.		CCSS is more specific than the CT standards. Factoring quadratic expressions to reveal the zeros of the function it defines is not assessed on CAPT.
CC.9-12.A.SSE.3b Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.	**CT.9-12.1.C.3.a.(2)** Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.		CCSS is more specific than the CT standard. Completing the square in a quadratic expression to reveal the maximum or minimum value of the function it defines is not assessed on CAPT.

Algebra			
Seeing Structure in Expressions			
Write expressions in equivalent forms to solve problems			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.A.SSE.3c Use the properties of exponents to transform expressions for exponential functions. For example the expression 1.15^t can be rewritten as $[1.15^{(1/12)}]^{(12t)} \approx 1.012^{(12t)}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.	**CT.9-12.1.C.3.a** Manipulate equations, inequalities and functions to solve problems. **CT.9-12.1.C.3.a.(2)** Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.	**CT.9-12.1.C.3.a** Manipulate equations, inequalities and functions to solve problems. **CT.9-12.1.C.3.a.(2)** Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.	
CC.9-12.A.SSE.4 Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.*	**CT.9-12.1.C.3.a.(2)** Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.		Deriving the formula for the sum of a finite geometric series is not assessed on CAPT.

Algebra			
Arithmetic with Polynomials and Rational Expressions			
Perform arithmetic operations on polynomials			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.A.APR.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	**CT.9-12.1.C.1.a.(4)** Describe and compare properties and classes of linear, quadratic and exponential functions.		Addition, subtraction and multiplication of polynomials is not assessed on CAPT.
Understand the relationship between zeros and factors of polynomials.			
CC.9-12.A.APR.2 Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a, the remainder on division by $x – a$ is $p(a)$, so $p(a) = 0$ if and only if $(x – a)$ is a factor of $p(x)$.	**CT.9-12.1.C.1.a.(4)** Describe and compare properties and classes of linear, quadratic and exponential functions. **CT.9-12.1.C.2.a** Represent and analyze linear and non-linear functions and relations symbolically and with tables and graphs.		The Remainder Theorem is not specified in the CT standards and is not assessed on CAPT.
CC.9-12.A.APR.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.	**CT.9-12.1.C.2.a** Represent and analyze linear and non-linear functions and relations symbolically and with tables and graphs. **CT.9-12.1.C.2.a.(3)** Recognize and explain the meaning of the slope and x- and y-intercepts as they relate to a context, graph, table or equation.	**CT.9-12.1.C.2.a.(3)** Recognize and explain the meaning of the slope and x- and y-intercepts as they relate to a context, graph, table or equation	Identifying zeros of polynomials is not specified in the CT standards.

Algebra			
Arithmetic with Polynomials and Rational Expressions			
Use polynomial identities to solve problems.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.A.APR.4 Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity $(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples.	**CT.9-12.1.C.3.a.(2)** Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.		Proving polynomial identities and using them to describe numerical relationships is not specified in the CT standard, and is not assessed on CAPT.
CC.9-12.A.APR.5 (+) Know and apply that the Binomial Theorem gives the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle. (The Binomial Theorem can be proved by mathematical induction or by a combinatorial argument.)	No match		

Algebra			
Arithmetic with Polynomials and Rational Expressions			
Rewrite rational expressions.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.A.APR.6 Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.	**CT.9-12.1.C.3.a.(2)** Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.		Rewriting simple rational expressions in different forms is not specified in the CT standards and is not assessed on CAPT.
CC.9-12.A.APR.7 (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.	**CT.9-12.1.E.1.a.(1)** Describe and compare properties and classes of functions, including exponential, polynomial, rational, logarithmic and trigonometric.		Understanding that rational expressions are closed under addition, subtraction, multiplication and division, and adding, subtracting multiplying and dividing rational expressions are not specified in the CT standards.

Algebra			
Creating Equations*			
Create equations that describe numbers or relationships			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.A.CED.1 Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*	**CT.9-12.1.C.3.a.(1)** Model and solve problems with linear, quadratic and absolute value equations and linear inequalities.	**CT.9-12.1.C.3.a.(1)** Model and solve problems with linear, quadratic and absolute value equations and linear inequalities.	
CC.9-12.A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	**CT.9-12.1.C.2.a.(1)** Represent functions and relations on the coordinate plane. **CT.9-12.1.C.3.a.(1)** Model and solve problems with linear, quadratic and absolute value equations and linear inequalities.	**CT.9-12.1.C.2.a.(1)** Represent functions and relations on the coordinate plane. **CT.9-12.1.C.3.a.(1)** Model and solve problems with linear, quadratic and absolute value equations and linear inequalities.	
CC.9-12.A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*	**CT.9-12.1.C.3.a** Manipulate equations, inequalities and functions to solve problems. **CT.9-12.1.C.3.a.(3)** Solve systems of two linear equations using algebraic or graphical methods. **CT.9-12.1.C.3.a.(1**) Model and solve problems with linear, quadratic and absolute value equations and linear inequalities. **CT.9-12.1.C.3.a.(2)** Determine equivalent representations of an	**CT.9-12.1.C.3.a** Manipulate equations, inequalities and functions to solve problems. **CT.9-12.1.C.3.a.(1)** Model and solve problems with linear, quadratic and absolute value equations and linear inequalities.	

Algebra			
Creating Equations*			
Create equations that describe numbers or relationships			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
	Algebraic equation or inequality to simplify and solve problems. **CT.9-12.1.E.1.a.(6)** Understand and use optimization strategies, including linear programming.		
CC.9-12.A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law $V = IR$ to highlight resistance R.	**CT.9-12.1.C.3.a.(2)** Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.	**CT.9-12.1.C.3.a.(2)** Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.	
Reasoning with Equations and Inequalities			
Understand solving equations as a process of reasoning and explain the reasoning			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.A.REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	**CT.9-12.1.C.3.a.(2)** Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.	**CT.9-12.1.C.3.a.(2)** Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.	The process of justifying each step is not inherent in the CT standards.
CC.9-12.A.REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	**CT.9-12.1.E.3.a.(1)** Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.		Solving simple rational and radical equations in one variable, and giving examples showing how extraneous solutions may arise is not specified in the CT standards and is not assessed on CAPT.

Algebra			
Reasoning with Equations and Inequalities			
Solve equations and inequalities in one variable			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	**CT.9-12.1.C.2.a.(1)** Represent functions and relations on the coordinate plane. **CT.9-12.1.C.3.a.(1)** Model and solve problems with linear, quadratic and absolute value equations and linear inequalities.	**CT.9-12.1.C.3.a.(1)** Model and solve problems with linear, quadratic and absolute value equations and linear inequalities.	
CC.9-12.A.REI.4 Solve quadratic equations in one variable.	**CT.9-12.1.C.3.a.(1)** Model and solve problems with linear, quadratic and absolute value equations and linear inequalities.	**CT.9-12.1.C.3.a.(1)** Model and solve problems with linear, quadratic and absolute value equations and linear inequalities.	
CC.9-12.A.REI.4a Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x – p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.	**CT.9-12.1.C.3.a** Manipulate equations, inequalities and functions to solve problems.		Completing the square and deriving the quadratic formula are not assessed on CAPT.
CC.9-12.A.REI.4b Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.	**CT.9-12.1.C.3.a.(1)** Model and solve problems with linear, quadratic and absolute value equations and linear inequalities.		Solving quadratic equations as appropriate to the initial form of the equation and recognizing when the quadratic formula gives complex solutions is not assessed on CAPT.

Algebra			
Reasoning with Equations and Inequalities			
Solve systems of equations.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.A.REI.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	**CT.9-12.1.C.3.a.(3)** Solve systems of two linear equations using algebraic or graphical methods.		Proving that replacing one equation in a system by the sum of that equation and a multiple of the other produces a system with the same solutions is not assessed on CAPT.
CC.9-12.A.REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	**CT.9-12.1.C.3.a.(3)** Solve systems of two linear equations using algebraic or graphical methods.	**CT.9-12.1.C.3.a.(3**) Solve systems of two linear equations using algebraic or graphical methods.	CT standards do not specify approximating solutions.
CC.9-12.A.REI.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$.	**CT.9-12.1.C.2.a.(4)** Evaluate and interpret the graphs of linear, exponential and polynomial functions. **CT.9-12.1.C.3.a.(3)** Solve systems of two linear equations using algebraic or graphical methods.	**CT.9-12.1.C.2.a.(4)** Evaluate and interpret the graphs of linear, exponential and polynomial functions. **CT.9-12.1.C.3.a.(3)** Solve systems of two linear equations using algebraic or graphical methods.	
CC.9-12.A.REI.8 (+) Represent a system of linear equations as a single matrix equation in a vector variable.	**CT.9-12.1.E.3.a.(3)** Use logarithms, vectors and matrices to solve problems.		
CC.9-12.A.REI.9 (+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3×3 or greater).	**CT.9-12.1.E.3.a.(3)** Use logarithms, vectors and matrices to solve problems.		

Algebra			
Reasoning with Equations and Inequalities			
Represent and solve equations and inequalities graphically.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	**CT.9-12.1.C.2.a.(4)** Evaluate and interpret the graphs of linear, exponential and polynomial functions.	**CT.9-12.1.C.2.a.(4)** Evaluate and interpret the graphs of linear, exponential and polynomial functions.	
CC.9-12.A.REI.11 Explain why the *x*-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.*	**CT.9-12.1.C.2.a.(4)** Evaluate and interpret the graphs of linear, exponential and polynomial functions.	**CT.9-12.1.C.2.a.(4)** Evaluate and interpret the graphs of linear, exponential and polynomial functions.	CCSS is more specific than the CT standard.
CC.9-12.A.REI.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	**CT.9-12.1.C.3.a.(3)** Solve systems of two linear equations using algebraic or graphical methods. **CT.9-12.1.C.3.a** Manipulate equations, inequalities and functions to solve problems.	**CT.9-12.1.C.3.a.(3)** Solve systems of two linear equations using algebraic or graphical methods. **CT.9-12.1.C.3.a** Manipulate equations, inequalities and functions to solve problems.	Solving systems of **inequalities** by graphing the solution set is not specified in the CT standards.

Functions			
Interpreting Functions			
Understand the concept of a function and use function notation			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.F.IF.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$.	**CT.9-12.1.C.1.a.(3)** Identify the characteristics of functions and relations, including domain and range.	**CT.9-12.1.C.1.a.(3)** Identify the characteristics of functions and relations, including domain and range.	
CC.9-12.F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	**CT.9-12.1.C.1.a.(3)** Identify the characteristics of functions and relations, including domain and range.	**CT.9-12.1.C.1.a.(3)** Identify the characteristics of functions and relations, including domain and range.	Function notation is not specified in the CT standard.
CC.9-12.F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for $n \geq 1$ (n is greater than or equal to 1).	**CT.9-12.1.C.1.a.(1)** Identify, describe, create and generalize numeric, geometric and statistical patterns with tables, graphs, words and symbolic rules. **CT.9-12.1.E.1.a.(7)** Apply the concepts of limits to sequences and asymptotic behavior of functions.	**CT.9-12.1.C.1.a.(1)** Identify, describe, create and generalize numeric, geometric and statistical patterns with tables, graphs, words and symbolic rules.	

Functions			
Interpreting Functions			
Interpret functions that arise in applications in terms of the context.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.F.1F.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*	**CT.9-12.1.C.2.a.(2)** Identify an appropriate symbolic representation for a function or relation displayed graphically or verbally. **CT.9-12.1.C.2.a.(3)** Recognize and explain the meaning of the slope and x- and y-intercepts as they relate to a context, graph, table or equation. **CT.9-12.1.E.2.a.(1)** Relate the graphical representation of a function to its function family and find equations, intercepts, maximum or minimum values, asymptotes and line of symmetry for that function.	**CT.9-12.1.C.2.a.(2)** Identify an appropriate symbolic representation for a function or relation displayed graphically or verbally. **CT.9-12.1.C.2.a.(3)** Recognize and explain the meaning of the slope and x- and y-intercepts as they relate to a context, graph, table or equation	
CC.9-12.F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function*.*	**CT.9-12.1.C.3.a.(1)** Model and solve problems with linear, quadratic and absolute value equations and linear inequalities.	**CT.9-12.1.C.3.a.(1)** Model and solve problems with linear, quadratic and absolute value equations and linear inequalities.	Interpretation of domain is not specified in the CT standard.

Functions			
Interpreting Functions			
Interpret functions that arise in applications in terms of the context.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.*	**CT.9-12.1.C.2.a.(3)** Recognize and explain the meaning of the slope and x- and y-intercepts as they relate to a context, graph, table or equation. **CT.9-12.1.E.2.a.(3)** Recognize that the slope of the tangent line to a curve represents the rate of change.	**CT.9-12.1.C.2.a.(3)** Recognize and explain the meaning of the slope and x- and y-intercepts as they relate to a context, graph, table or equation. **CT.9-12.1.E.2.a.(3)** Recognize that the slope of the tangent line to a curve represents the rate of change.	The CT standards do not make a connection between slope and average rate of change.

Functions			
Interpreting Functions			
Analyze functions using different representations.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.F.IF.7: Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.*	**CT.9-12.1.C.2.a.(1)** Represent functions and relations on the coordinate plane. **CT.9-12.1.C.2.a.(3)** Recognize and explain the meaning of the slope and x- and y-intercepts as they relate to a context, graph, table or equation. **CT.9-12.1.C.2.a.(4)** Evaluate and interpret the graphs of linear, exponential and polynomial functions. **CT.9-12.1.E.2.a.(1)** Relate the graphical representation of a function to its function family and find equations, intercepts, maximum or minimum values, asymptotes and line of symmetry for that function.	**CT.9-12.1.C.2.a.(1)** Represent functions and relations on the coordinate plane. **CT.9-12.1.C.2.a.(3)** Recognize and explain the meaning of the slope and x- and y-intercepts as they relate to a context, graph, table or equation. **CT.9-12.1.C.2.a.(4)** Evaluate and interpret the graphs of linear, exponential and polynomial functions.	
CC.9-12.F.IF.7a Graph linear and quadratic functions and show intercepts, maxima, and minima.	**CT.9-12.1.C.2.a.(3)** Recognize and explain the meaning of the slope and x- and y-intercepts as they relate to a context, graph, table or equation. **CT.9-12.1.E.2.a.(1)** Relate the graphical representation of a function to its function family and find equations, intercepts, maximum or minimum values, asymptotes and line of symmetry for that function.	**CT.9-12.1.C.2.a.(3)** Recognize and explain the meaning of the slope and *x*- and *y*-intercepts as they relate to a context, graph, table or equation.	

Functions			
Interpreting Functions			
Analyze functions using different representations.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.F.IF.7b Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.	**CT.9-12.1.C.2.a.(1)** Represent functions and relations on the coordinate plane. **CT.9-12.1.C.3.a.(1)** Model and solve problems with linear, quadratic and absolute value equations and linear inequalities.	**CT.9-12.1.C.2.a.(1)** Represent functions and relations on the coordinate plane. **CT.9-12.1.C.3.a.(1)** Model and solve problems with linear, quadratic and absolute value equations and linear inequalities.	Square root, cube root and piece-wise functions are not specified in the CT standards.
CC.9-12.F.IF.7c Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.	**CT.9-12.1.E.1.a.(1)** Describe and compare properties and classes of functions, including exponential, polynomial, rational, logarithmic and trigonometric.		
CC.9-12.F.IF.7d (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.	**CT.9-12.1.E.1.a.(1)** Describe and compare properties and classes of functions, including exponential, polynomial, rational, logarithmic and trigonometric.		
CC.9-12.F.IF.7e Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	**CT.9-12.1.E.1.a.(1)** Describe and compare properties and classes of functions, including exponential, polynomial, rational, logarithmic and trigonometric.		

Functions			
Interpreting Functions			
Analyze functions using different representations.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.F.IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.	**CT.9-12.1.C.3.a.(2)** Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems. **CT.9-12.1.E.3.a.(1)** Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.	**CT.9-12.1.C.3.a.(2)** Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.	
CC.9-12.F.IF.8a Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.	**CT.9-12.1.C.3.a.(2**) Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems. **CT.9-12.1.E.3.a.(1)** Determine equivalent representations of an algebraic equation or inequality to simplify and solve problems.		Factoring and completing the square in a quadratic equation is not assessed on CAPT.
CC.9-12.F.IF.8b Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)^{12t}$, $y = (1.2)^{(t/10)}$, and classify them as representing exponential	**CT.9-12.1.C.1.a.(4)** Describe and compare properties and classes of linear, quadratic and exponential functions. **CT.9-12.1.E.1.a.(4)** Solve problems involving financial applications including compound interest, amortization of loans, and investments.	**CT.9-12.1.C.1.a.(4)** Describe and compare properties and classes of linear, quadratic and exponential functions. **CT.9-12.1.E.1.a.(4)** Solve problems involving financial applications including compound interest, amortization of loans, and investments.	

Functions Overview			
Interpreting Functions			
Analyze functions using different representations.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
	CT.9-12.1.E.1.a.(1) Describe and compare properties and classes of functions, including exponential, polynomial, rational, logarithmic and trigonometric	**CT.9-12.1.E.1.a.(1)** Describe and compare properties and classes of functions, including exponential, polynomial, rational, logarithmic and trigonometric	
CC.9-12.F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.	**CT.9-12.1.C.2.a.(1)** Represent functions and relations on the coordinate plane. **CT.9-12.1.C.2.a.(2)** Identify an appropriate symbolic representation for a function or relation displayed graphically or verbally. **CT.9-12.1.C.1.a.(1)** Identify, describe, create and generalize numeric, geometric and statistical patterns with tables, graphs, words and symbolic rules. **CT.9-12.1.E.2.a.(1)** Relate the graphical representation of a function to its function family and find equations, intercepts, maximum or minimum values, asymptotes and line of symmetry for that function.	**CT.9-12.1.C.2.a.(1)** Represent functions and relations on the coordinate plane. **CT.9-12.1.C.2.a.(2)** Identify an appropriate symbolic representation for a function or relation displayed graphically or verbally. **CT.9-12.1.C.1.a.(1)** Identify, describe, create and generalize numeric, geometric and statistical patterns with tables, graphs, words and symbolic rules.	

Functions			
Building Functions			
Build a function that models a relationship between two quantities.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.F.BF.1 Write a function that describes a relationship between two quantities.*	**CT.9-12.1.C.2.a.(2)** Identify an appropriate symbolic representation for a function or relation displayed graphically or verbally.	**CT.9-12.1.C.2.a.(2)** Identify an appropriate symbolic representation for a function or relation displayed graphically or verbally.	
CC.9-12.F.BF.1a Determine an explicit expression, a recursive process, or steps for calculation from a context.	**CT.9-12.1.C.1.a.(1)** Identify, describe, create and generalize numeric, geometric and statistical patterns with tables, graphs, words and symbolic rules. **CT.9-12.1.C.2.a.(2)** Identify an appropriate symbolic representation for a function or relation displayed graphically or verbally. **CT.9-12.1.E.1.a.(2)** Analyze essential relations in a problem to determine possible functions that could model the situation.	**CT.9-12.1.C.1.a.(1)** Identify, describe, create and generalize numeric, geometric and statistical patterns with tables, graphs, words and symbolic rules. **CT.9-12.1.C.2.a.(2)** Identify an appropriate symbolic representation for a function or relation displayed graphically or verbally.	The concept of a recursive process is not specified in the CT standards.
CC.9-12.F.BF.1b Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.	**CT.9-12.1.E.3.a.(2)** Combine, compose and invert functions.		

Functions			
Building Functions			
Build a function that models a relationship between two quantities.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.F.BF.1c (+) Compose functions. For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time.	**CT.9-12.1.E.3.a.(2)** Combine, compose and invert functions.		
CC.9-12.F.BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.*	**CT.9-12.1.C.1.a.(1)** Identify, describe, create and generalize numeric, geometric, and statistical patterns with tables, graphs, words and symbolic rules.	**CT.9-12.1.C.1.a.(1)** Identify, describe, create and generalize numeric, geometric, and statistical patterns with tables, graphs, words and symbolic rules.	
Build new functions from existing functions.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.F.BF.3 Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.	**CT.9-12.1.E.2.a.(2)** Recognize the effect of changes in parameters on the graphs of functions or relations.		Identifying the effect on the graph of transformations of given functions is not specified in the CT standard.
CC.9-12.F.BF.4 Find inverse functions.	**CT.9-12.1.E.3.a.(2)** Combine, compose and invert functions.		

Functions			
Building Functions			
Build new functions from existing functions.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.F.BF.4a Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse. For example, $f(x) = 2(x^3)$ for $x > 0$ or $f(x) = (x+1)/(x-1)$ for $x \neq 1$ (x not equal to 1).	No match		
CC.9-12.F.BF.4b (+) Verify by composition that one function is the inverse of another.	**CT.9-12.1.E.3.a.(2)** Combine, compose and invert functions.		Verifying by composition that one function is the inverse of another is not specified in the CT standard.
CC.9-12.F.BF.4c (+) Read values of an inverse function from a graph or a table, given that the function has an inverse.	**CT.9-12.1.E.3.a.(2)** Combine, compose and invert functions.		Reading values of an inverse function from a graph or a table is not specified in the CT standard.
CC.9-12.F.BF.4d (+) Produce an invertible function from a non-invertible function by restricting the domain.	**CT.9-12.1.E.3.a.(2)** Combine, compose and invert functions.		Producing an invertible function from a non-invertible function by restricting the domain is not specified in the CT standard.
CC.9-12.F.BF.5 (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.	**CT.9-12.1.E.3.a.(3)** Use logarithms, vectors and matrices to solve problems.		

Functions			
Linear, Quadratic, and Exponential Models*			
Construct and compare linear, quadratic, and exponential models and solve problems.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.F.LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.	**CT.9-12.1.C.1.a.(4)** Describe and compare properties and classes of linear, quadratic and exponential functions. **CT.9-12.1.E.1.a.(1)** Describe and compare properties and classes of functions, including exponential, polynomial, rational, logarithmic and trigonometric. **CT.9-12.1.E.1.a.(2)** Analyze essential relations in a problem to determine possible functions that could model the situation.	**CT.9-12.1.C.1.a.(4)** Describe and compare properties and classes of linear, quadratic and exponential functions.	
CC.9-12.F.LE.1a Prove that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.*	**CT.9-12.1.C.1.a.(4)** Describe and compare properties and classes of linear, quadratic and exponential functions.		Proving that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals are not assessed on CAPT.
CC.9-12.F.LE.1b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.	**CT.9-12.1.C.3.a.(1)** Model and solve problems with linear, quadratic and absolute value equations and linear inequalities. **CT.9-12.1.E.1.a.(2)** Analyze essential relations in a problem to determine possible functions that could model the situation. **CT.9-12.2.C.2.b.(2)** Solve problems using direct and inverse variation. **CT.9-12.1.E.1.a.(5)** Solve problems involving direct and inverse variation.	**CT.9-12.1.C.3.a.(1)** Model and solve problems with linear, quadratic and absolute value equations and linear inequalities. **CT.9-12.2.C.2.b.(2)** Solve problems using direct and inverse variation.	

Functions			
Linear, Quadratic, and Exponential Models*			
Construct and compare linear, quadratic, and exponential models and solve problems.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.F.LE.1c Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	**CT.9-12.1.E.1.a.(2)** Analyze essential relations in a problem to determine possible functions that could model the situation. **CT.9-12.C.2.a.2.(1)** Select and use appropriate methods for computing in a variety of contexts.	**CT.9-12.C.2.a.2.(1)** Select and use appropriate methods for computing in a variety of contexts.	Definition of exponential is implicit in the CT standards.
CC.9-12.F.LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).	**CT.9-12.1.C.2.a.(2)** Identify an appropriate symbolic representation for a function or relation displayed graphically or verbally.	**CT.9-12.1.C.2.a.(2)** Identify an appropriate symbolic representation for a function or relation displayed graphically or verbally.	
CC.9-12.F.LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	**CT.9-12.1.C.1.a.(4)** Describe and compare properties and classes of linear, quadratic and exponential functions. **CT.9-12.1.E.1.a.(1)** Describe and compare properties and classes of functions, including exponential, polynomial, rational, logarithmic and trigonometric.	**CT.9-12.1.C.1.a.(4)** Describe and compare properties and classes of linear, quadratic and exponential functions.	This specific property of exponential functions is not specified in the CT standards.
CC.9-12.F.LE.4 For exponential models, express as a logarithm the solution to $ab^{(ct)} = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.	**CT.9-12.1.E.3.a.(3)** Use logarithms, vectors and matrices to solve problems.		The solution to this type of equation is not specified in the CT standards and is not assessed on CAPT.

Functions			
Linear, Quadratic, and Exponential Models*			
Interpret expressions for functions in terms of the situation they model.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.F.LE.5 Interpret the parameters in a linear, quadratic, or exponential function in terms of a context.	**CT.9-12.1.C.1.a.(3)** Identify the characteristics of functions and relations, including domain and range. **CT.9-12.1.E.2.a.(2)** Recognize the effect of changes in parameters on the graphs of functions or relations.	**CT.9-12.1.C.1.a.(3)** Identify the characteristics of functions and relations, including domain and range.	In terms of context is not specified in the CT standards.
Trigonometric Functions			
Extend the domain of trigonometric functions using the unit circle.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.F.TF.1 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.	**CT.9-12.1.E.1.a.(1)** Describe and compare properties and classes of functions, including exponential, polynomial, rational, logarithmic and trigonometric.		The unit circle is not specified in the CT standard. Understanding radian measure of an angle is not assessed on CAPT
CC.9-12.F.TF.2 Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.	**CT.9-12.1.E.1.a.(1)** Describe and compare properties and classes of functions, including exponential, polynomial, rational, logarithmic and trigonometric.		The unit circle is not specified in the CT standard. Explaining how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers is not assessed on CAPT.

Functions			
Trigonometric Functions			
Extend the domain of trigonometric functions using the unit circle.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.F.TF.3 (+) Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$, $\pi/4$ and $\pi/6$, and use the unit circle to express the values of sine, cosine, and tangent for $\pi - x$, $\pi + x$, and $2\pi - x$ in terms of their values for x, where x is any real number.	**CT.9-12.1.E.1.a.(1)** Describe and compare properties and classes of functions, including exponential, polynomial, rational, logarithmic and trigonometric.		
CC.9-12.F.TF.4 (+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.	**CT.9-12.1.E.1.a.(1)** Describe and compare properties and classes of functions, including exponential, polynomial, rational, logarithmic and trigonometric.		
Model periodic phenomena with trigonometric functions.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.F.TF.5 Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.*	**CT.9-12.1.E.1.a.(1)** Describe and compare properties and classes of functions, including exponential, polynomial, rational, logarithmic and trigonometric. **CT.9-12.1.E.2.a.(2)** Recognize the effect of changes in parameters on the graphs of functions or relations.		Amplitude, frequency and midline are not specified in the CT standards.

Functions			
Trigonometric Functions			
Model periodic phenomena with trigonometric functions.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.F.TF.6 (+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.	**CT.9-12.1.E.3.a.(2)** Combine, compose and invert functions.		Inverse trigonometric functions are not specified in the CT standard.
CC.9-12.F.TF.7 (+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.*	No Match		
Prove and apply trigonometric identities.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.F.TF.8 Prove the Pythagorean identity $(\sin A)^2 + (\cos A)^2 = 1$ and use it to calculate trigonometric ratios.	No Match		
CC.9-12.F.TF.9 (+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.	No Match		

Geometry			
Congruence			
Experiment with transformations in the plane.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.G.CO.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.	No Match		
CC.9-12.G.CO.2 Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).	**CT.9-12.3.C.2.a.(3)** Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations.	**CT.9-12.3.C.2.a.(3)** Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations.	
CC.9-12.G.CO.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.	**CT.9-12.3.C.2.a.(3)** Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations. **CT.9-12.3.E.2.a.(3)** Represent translations, reflections, rotations and dilations of plane figures using sketches, coordinates, vectors, function notation and matrices to examine the effects of transformations and their composites and to solve related geometric problems.	**CT.9-12.3.C.2.a.(3)** Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations.	

Geometry			
Congruence			
Experiment with transformations in the plane.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.G.CO.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	No Match		
CC.9-12.G.CO.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.	**CT.9-12.3.C.1.a** Investigate relationships among plane and solid geometric figures using geometric models, constructions and tools. **CT.9-12,3,C,2,a(3)** Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations.	**CT.9-12.3.C.1.a** Investigate relationships among plane and solid geometric figures using geometric models, constructions and tools. **CT.9-12.3.C.2.a.(3**) Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations.	
Understand congruence in terms of rigid motions:			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.G.CO.6 Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.	**CT.9-12.3.C.2.a.(3)** Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations.	**CT.9-12.3.C.2.a.(3)** Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations.	
CC.9-12.G.CO.7 Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are econgruent.	**CT.9-12.3.C.2.a.(3)** Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations.	**CT.9-12.3.C.2.a.(3)** Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations.	

Geometry			
Congruence			
Understand congruence in terms of rigid motions:			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.G.CO.8 Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.	**CT.9-12.3.C.2.a.(3)** Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations.	**CT.9-12.3.C.2.a.(3)** Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations.	
Prove geometric theorems:			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.G.CO.9 Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.	**CT.9-12.3.E.1.a.(3)** Use deductive arguments, including direct and indirect proofs, to develop an understanding of an axiomatic approach to geometry.		Theorems are not specified in the CT standards.
CC.9-12.G.CO.10 Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180 degrees; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.	**CT.9-12.3.E.1.a.(3)** Use deductive arguments, including direct and indirect proofs, to develop an understanding of an axiomatic approach to geometry.		Theorems are not specified in the CT standards.
CC.9-12.G.CO.11 Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.	**CT.9-12.3.E.1.a.(3)** Use deductive arguments, including direct and indirect proofs, to develop an understanding of an axiomatic approach to geometry.		Theorems are not specified in the CT standards.

Geometry			
Congruence			
Make geometric constructions:			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.G.CO.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.	**CT.9-12.3.C.1.a.(1)** Use models and constructions to make, test and summarize conjectures involving properties of geometric figures.	**CT.9-12.3.C.1.a.(1)** Use models and constructions to make, test and summarize conjectures involving properties of geometric figures.	The type of construction is not specified in the CT standard.
CC.9-12.G.CO.13 Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.	**CT.9-12.3.C.1.a.(1)** Use models and constructions to make, test and summarize conjectures involving properties of geometric figures.		The type of construction is not specified in the CT standard.

Geometry			
Similarity, Right Triangles, and Trigonometry			
Understand similarity in terms of similarity transformations.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.G.SRT.1 Verify experimentally the properties of dilations given by a center and a scale factor: a. A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	**CT.9-12.3.C.2.a.(3)** Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations.	**CT.9-12.3.C.2.a.(3)** Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations.	Dilation is not specified in the CT standard.
CC.9-12.G.SRT.2 Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.	**CT.9-12.3.C.2.a.(3)** Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations.	**CT.9-12.3.C.2.a.(3)** Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations.	
CC.9-12.G.SRT.3 Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.	**CT.9-12.3.C.2.a.(3)** Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations.	**CT.9-12.3.C.2.a.(3**) Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations.	

Geometry			
Similarity, Right Triangles, and Trigonometry			
Prove theorems involving similarity.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.G.SRT.4 Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.	**CT.9-12.3.E.1.a.(3)** Use deductive arguments, including direct and indirect proofs, to develop an understanding of an axiomatic approach to geometry.		Theorems about triangles are not specified in the CT standard.
CC.9-12.G.SRT.5: Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	**CT.9-12.3.C.1.a.(3)** Determine and compare properties of classes of polygons. **CT.9-12.3.C.2.a.(3)** Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations.	**CT.9-12.3.C.1.a.(3)** Determine and compare properties of classes of polygons. **CT.9-12.3.C.2.a.(3)** Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations.	

Geometry			
Similarity, Right Triangles, and Trigonometry			
Define trigonometric ratios and solve problems involving right triangles.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.G.SRT.6 Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	No Match		
CC.9-12.G.SRT.7 Explain and use the relationship between the sine and cosine of complementary angles.	No Match		
CC.9-12.G.SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.*	**CT.9-12.3.C.3.a.(2)** Use indirect methods including the Pythagorean Theorem, trigonometric ratios and proportions in similar figures to solve a variety of measurement problems. **CT.9-12.3.E.3.a.(2)** Use properties of similarity and techniques of trigonometry to make indirect measurements of lengths and angles to solve a variety of problems.	**CT.9-12.3.C.3.a.(2)** Use indirect methods including the Pythagorean Theorem, trigonometric ratios and proportions in similar figures to solve a variety of measurement problems.	

Geometry			
Similarity, Right Triangles, and Trigonometry			
Apply trigonometry to general triangles:			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.G.SRT.9 (+) Derive the formula $A = (1/2)ab \sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.	No Match		
CC.9-12.G.SRT.10 (+) Prove the Laws of Sines and Cosines and use them to solve problems.	No Match		
CC.9-12.G.SRT.11 (+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).	**CT.9-12.3.E.3.a.(2)** Use properties of similarity and techniques of trigonometry to make indirect measurements of lengths and angles to solve a variety of problems.		The Law of Sines and Law of Cosines are not specified in the CT standard.

Geometry			
Circles			
Understand and apply theorems about circles.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.G.C.1 Prove that all circles are similar.	**CT.9-12.3.C.2.a.(3)** Apply transformations to plane figures to determine congruence, similarity, symmetry and tessellations.		Proving that all circles are similar is not specified in the CT standards and is not assessed on CAPT.
CC.9-12.G.C.2 Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.	**CT.9-12.3.C.1.a.(1)** Use models and constructions to make, test and summarize conjectures involving properties of geometric figures.		Circle theorems are not specified in the CT standards and are not assessed on CAPT.
CC.9-12.G.C.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.	**CT.9-12.3.C.1.a.(1)** Use models and constructions to make, test and summarize conjectures involving properties of geometric figures.		These constructions and proofs are not specified in the CT standard and are not assessed on CAPT.
CC.9-12.G.C.4 (+) Construct a tangent line from a point outside a given circle to the circle.	**CT.9-12.3.C.1.a.(1)** Use models and constructions to make, test and summarize conjectures involving properties of geometric figures.		This construction is not specified in the CT standard and is not assessed on CAPT.
Find arc lengths and areas of sectors of circles			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.G.C.5 Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.	**CT.9-12.3.C.3.a.(1)** Select appropriate units, scales, degree of precision, and strategies to determine length, angle measure, perimeter, circumference and area of plane geometric figures.		Arcs, sectors, and radian measure are not specified in the CT standards and are not assessed on CAPT.

Geometry			
Expressing Geometric Properties with Equations			
Translate between the geometric description and the equation for a conic section:			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.G.GPE.1 Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.	**CT.9-12.3.E.2.a.(2)** Use Cartesian, navigational, polar and spherical systems to represent, analyze and solve geometric and measurement problems. **CT.9-12.1.E.1.a.(3)** Explore conic sections and their applications graphically and symbolically.		
CC.9-12.G.GPE.2 Derive the equation of a parabola given a focus and directrix.	**CT.9-12.3.E.2.a.(2)** Use Cartesian, navigational, polar and spherical systems to represent, analyze and solve geometric and measurement problems. **CT.9-12.1.E.1.a.(3)** Explore conic sections and their applications graphically and symbolically.		
CC.9-12.G.GPE.3 (+) Translate between the geometric description and the equation for a conic section. Derive the equations of ellipses and hyperbolas given the foci.	**CT.9-12.3.E.2.a.(2)** Use Cartesian, navigational, polar and spherical systems to represent, analyze and solve geometric and measurement problems. **CT.9-12.1.E.1.a.(3)** Explore conic sections and their applications graphically and symbolically.		

Geometry			
Expressing Geometric Properties with Equations			
Use coordinates to prove simple geometric theorems algebraically.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.G.GPE.4 For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).	**CT.9-12.3.E.1.a.(3)** Use deductive arguments, including direct and indirect proofs, to develop an understanding of an axiomatic approach to geometry. **CT.9-12.3.E.2.a.(2)** Use Cartesian, navigational, polar and spherical systems to represent, analyze and solve geometric and measurement problems.		
CC.9-12.G.GPE.5 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).	**CT.9-12.3.C.2.a.(1)** Interpret geometric relationships using algebraic equations and inequalities and vice versa. **CT.9-12.3.E.1.a.(3)** Use deductive arguments, including direct and indirect proofs, to develop an understanding of an axiomatic approach to geometry. **CT.9-12.3.E.2.a.(2)** Use Cartesian, navigational, polar and spherical systems to represent, analyze and solve geometric and measurement problems.	**CT.9-12.3.C.2.a.(1**) Interpret geometric relationships using algebraic equations and inequalities and vice versa.	

Geometry			
Expressing Geometric Properties with Equations			
Use coordinates to prove simple geometric theorems algebraically.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.G.GPE.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	**CT.9-12.3.C.2.a.(1)** Interpret geometric relationships using algebraic equations and inequalities and vice versa. **CT.9-12.3.E.1.a.(3)** Use deductive arguments, including direct and indirect proofs, to develop an understanding of an axiomatic approach to geometry. **CT.9-12.3.E.2.a.(2)** Use Cartesian, navigational, polar and spherical systems to represent, analyze and solve geometric and measurement problems.	**CT.9-12.3.C.2.a.(1)** Interpret geometric relationships using algebraic equations and inequalities and vice versa.	
CC.9-12.G.GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.*	**CT.9-12,3.C.2.a.(1)** Interpret geometric relationships using algebraic equations and inequalities and vice versa. **CT 9-12.3.C.3.a(1)** Select appropriate units, scales, degree of precision, and strategies to determine length, angle measure, perimeter, circumference and area of plane geometric figures. **CT.9-12.3.C.3.a.(2)** Use indirect methods including the Pythagorean Theorem, trigonometric ratios and proportions in similar figures to solve a variety of measurement problems.	**CT.9-12.3.C.2.a.(1)** Interpret geometric relationships using algebraic equations and inequalities and vice versa.	

Geometry			
Geometric Measurement and Dimension			
Explain volume formulas and use them to solve problems:			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.G.GMD.1 Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.	**CT.9-12.3.C.3.a.(4)** Use two-dimensional representations and formal and informal methods to solve surface-area and volume problems. **CT.9-12.3.E.3.a.(2)** Use properties of similarity and techniques of trigonometry to make indirect measurements of lengths and angles to solve a variety of problems.		Dissection arguments and Cavalieri's principle are not specified in the CT standards. Providing an argument for a formula is not assessed on CAPT.
CC.9-12.G.GMD.2 (+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.	**CT.9-12.3.C.3.a.(4)** Use two-dimensional representations and formal and informal methods to solve surface-area and volume problems.		Using Cavalieri's principle is not specified in the CT standards and is not assessed on CAPT.
CC.9-12.G.GMD.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.*	**CT.9-12.3.C.3.a.(4)** Use two-dimensional representations and formal and informal methods to solve surface-area and volume problems.	**CT.9-12.3.C.3.a.(4)** Use two-dimensional representations and formal and informal methods to solve surface-area and volume problems.	
Visualize relationships between two-dimensional and three-dimensional objects:			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.G.GMD.4 Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.	**CT.9-12.3.E.2.a.(1)** Visualize three-dimensional objects from different perspectives and analyze cross-sections, surface area and volume.		Rotations are not specified in the 9-12 CT standards.

Geometry			
Modeling with Geometry			
Apply geometric concepts in modeling situations			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.G.MG.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).*	**CT.9-12.3.C.3.a.(4)** Use two-dimensional representations and formal and informal methods to solve surface-area and volume problems.	**CT.9-12.3.C.3.a.(4)** Use two-dimensional representations and formal and informal methods to solve surface-area and volume problems.	
CC.9-12.G.MG.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).*	**CT.9-12.3.C.3.a.(4)** Use two-dimensional representations and formal and informal methods to solve surface-area and volume problems.	**CT.9-12.3.C.3.a.(4)** Use two-dimensional representations and formal and informal methods to solve surface-area and volume problems.	Density concepts are not specified in the CT standards.
CC.9-12.G.MG.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).*	**CT.9-12.3.C.1.a.(1)** Use models and constructions to make, test and summarize conjectures involving properties of geometric figures.	**CT.9-12.3.C.1.a.(1)** Use models and constructions to make, test and summarize conjectures involving properties of geometric figures.	

Statistics and Probability			
Interpreting Categorical and Quantitative Data			
Summarize, represent, and interpret data on a single count or measurement variable:			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.S.ID.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).	**CT.9-12.4.C.1.a.(1)** Collect real data and create meaningful graphical representations of the data.	**CT.9-12.4.C.1.a.(1)** Collect real data and create meaningful graphical representations of the data.	Graph types are not specified in the 9-12 CT standards.
CC.9-12.S.ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.	**CT.9-12.4.C.2.a.(3)** Determine and use measures of spread and central tendency to describe and compare sets of data. **CT.9-12.4.E.3.b.(1)** Explore the characteristics and applications of the normal distribution and standardized scores.	**CT.9-12.4.C.2.a.(3)** Determine and use measures of spread and central tendency to describe and compare sets of data.	The CT standard specifies the normal distribution only. CCSS allows for non-normality.
CC.9-12.S.ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	**CT.9-12.4.C.2.a.(3)** Determine and use measures of spread and central tendency to describe and compare sets of data.	**CT.9-12.4.C.2.a.(3)** Determine and use measures of spread and central tendency to describe and compare sets of data.	
CC.9-12.S.ID.4 Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.	**CT.9-12.4.E.3.b.(1)** Explore the characteristics and applications of the normal distribution and standardized scores.		

Statistics and Probability			
Interpreting Categorical and Quantitative Data			
Summarize, represent, and interpret data on two categorical and quantitative variables:			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.S.ID.5 Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.	**CT.9-12.4.C.1.a.** Create the appropriate visual or graphical representation of real data.	**CT.9-12.4.C.1.a.** Create the appropriate visual or graphical representation of real data.	
CC.9-12.S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.	**CT.9-12.4.C.1.a.** Create the appropriate visual or graphical representation of real data. **CT.9-12.4.C.1.a.(1)** Collect real data and create meaningful graphical representations of the data. **CT.9-12.4.C.1.a.(2)** Develop, use and explain applications and limitations of linear and nonlinear models and regression in a variety of contexts.	**CT.9-12.4.C.1.a.** Create the appropriate visual or graphical representation of real data. **CT.9-12.4.C.1.a.(1)** Collect real data and create meaningful graphical representations of the data. **CT.9-12.4.C.1.a.(2)** Develop, use and explain applications and limitations of linear and nonlinear models and regression in a variety of contexts.	

Statistics and Probability			
Interpreting Categorical and Quantitative Data			
Summarize, represent, and interpret data on two categorical and quantitative variables:			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.S.ID.6a Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear and exponential models.	**CT.9-12.4.C.1.a.(2)** Develop, use and explain applications and limitations of linear and nonlinear models and regression in a variety of contexts.	**CT.9-12.4.C.1.a.(2)** Develop, use and explain applications and limitations of linear and nonlinear models and regression in a variety of contexts.	
CC.9-12.S.ID.6b Informally assess the fit of a function by plotting and analyzing residuals.	No Match		
CC.9-12.S.ID.6c Fit a linear function for a scatter plot that suggest a linear association.	**CT.9-12.4.C.1.a.(2)** Develop, use and explain applications and limitations of linear and nonlinear models and regression in a variety of contexts.	**CT.9-12.4.C.1.a.(2)** Develop, use and explain applications and limitations of linear and nonlinear models and regression in a variety of contexts.	
Interpret linear models:			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.S.ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	**CT.9-12.1.C.2.a.(3)** Recognize and explain the meaning of the slope and x- and y-intercepts as they relate to a context, graph, table or equation.	**CT.9-12.1.C.2.a.(3)** Recognize and explain the meaning of the slope and x- and y-intercepts as they relate to a context, graph, table or equation.	
CC.9-12.S.ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.	**CT.9-12.4.E.1.a.(2)** Apply and defend regression models for bivariate data and use them to formulate predictions.		
CC.9-12.S.ID.9 Distinguish between correlation and causation	**CT.9-12.4.E.1.a.(2)** Apply and defend regression models for bivariate data and use them to formulate predictions.		Causation is not specified in the CT standard.

Statistics and Probability			
Making Inferences and Justifying Conclusions			
Understand and evaluate random processes underlying statistical experiments.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.S.IC.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population.	**CT.9-12.4.C.2.a.(2)** Use data from samples to make inferences about a population and determine whether claims are reasonable or false.	**CT.9-12.4.C.2.a.(2)** Use data from samples to make inferences about a population and determine whether claims are reasonable or false.	
CC.9-12.S.IC.2 Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?	**CT.9-12.4.C.3.a.(3)** Apply theoretical and experimental probabilities appropriately to solve problems and predict experimental results. **CT.9-12.4.C.2.a.(2)** Use data from samples to make inferences about a population and determine whether claims are reasonable or false.	**CT.9-12.4.C.3.a.(3)** Apply theoretical and experimental probabilities appropriately to solve problems and predict experimental results. **CT.9-12.4.C.2.a.(2)** Use data from samples to make inferences about a population and determine whether claims are reasonable or false.	
Make inferences and justify conclusions from sample surveys, experiments, and observational studies.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.S.IC.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	**CT.9-12.4.E.2.a.(2)** Describe characteristics of sampling methods and analyze the effects of random versus biased sampling.		
CC.9-12.S.IC.4 Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.	**CT.9-12.4.C.2.a.(2)** Use data from samples to make inferences about a population and determine whether claims are reasonable or false.	**CT.9-12.4.C.2.a.(2)** Use data from samples to make inferences about a population and determine whether claims are reasonable or false.	

Statistics and Probability			
Making Inferences and Justifying Conclusions			
Make inferences and justify conclusions from sample surveys, experiments, and observational studies.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.S.IC.5 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.	**CT.9-12.4.C.2.a.(2)** Use data from samples to make inferences about a population and determine whether claims are reasonable or false.	**CT.9-12.4.C.2.a.(2)** Use data from samples to make inferences about a population and determine whether claims are reasonable or false.	Using data from randomized experiments and simulations is not specified in the CT standards.
CC.9-12.S.IC.6 Evaluate reports based on data.	**CT.9-12.4.C.2.a.(2)** Use data from samples to make inferences about a population and determine whether claims are reasonable or false.	**CT.9-12.4.C.2.a.(2)** Use data from samples to make inferences about a population and determine whether claims are reasonable or false.	
Conditional Probability and the Rules of Probability			
Understand independence and conditional probability and use them to interpret data.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.S.CP.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").	**CT.9-12.4.C.3.a.(2)** Explore the concepts of conditional probability in real-world contexts.	**CT.9-12.4.C.3.a.(2)** Explore the concepts of conditional probability in real-world contexts.	
CC.9-12.S.CP.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.	**CT.9-12.4.C.3.a.(2)** Explore the concepts of conditional probability in real-world contexts.	**CT.9-12.4.C.3.a.(2)** Explore the concepts of conditional probability in real-world contexts.	

Statistics and Probability			
Conditional Probability and the Rules of Probability			
Understand independence and conditional probability and use them to interpret data.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.S.CP.3 Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.	**CT.9-12.4.C.3.a.(2)** Explore the concepts of conditional probability in real-world contexts**.**	**CT.9-12.4.C.3.a.(2)** Explore the concepts of conditional probability in real-world contexts.	
CC.9-12.S.CP.4 Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.	**CT.9-12.4.C.3.a.(2)** Explore the concepts of conditional probability in real-world contexts.	**CT.9-12.4.C.3.a.(2)** Explore the concepts of conditional probability in real-world contexts.	

Statistics and Probability			
Conditional Probability and the Rules of Probability			
Understand independence and conditional probability and use them to interpret data.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.S.CP.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.	**CT.9-12.4.C.3.a.(2)** Explore the concepts of conditional probability in real-world contexts.	**CT.9-12.4.C.3.a.(2)** Explore the concepts of conditional probability in real-world contexts.	
CC.9-12.**S.CP.6** Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.	**CT.9-12.4.C.3.a.(2)** Explore the concepts of conditional probability in real-world contexts.	**CT.9-12.4.C.3.a.(2)** Explore the concepts of conditional probability in real-world contexts.	
CC.9-12.S.CP.7 Apply the Addition Rule, P(A or B) = P(A) + P(B) - P(A and B), and interpret the answer in terms of the model.	**CT.9-12.4.C.3.a.(1)** Determine outcomes and solve problems involving the probabilities of events.	**CT.9-12.4.C.3.a.(1)** Determine outcomes and solve problems involving the probabilities of events.	The Addition Rule is not specified in CT standards.
CC.9-12.S.CP.8 (+) Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model.	**CT.9-12.4.C.3.a.(2)** Explore the concepts of conditional probability in real-world contexts.		The Multiplication Rule is not specified in the CT standards and is not assessed on CAPT.
CC.9-12.S.CP.9 (+) Use permutations and combinations to compute probabilities of compound events and solve problems.	**CT.9-12.4.E.3.a.(1)** Understand and use permutations, combinations, recursion and mathematical induction to solve problems.	**CT.9-12.4.C.3.a.(1)** Determine outcomes and solve problems involving the probabilities of events.	

Statistics and Probability			
Conditional Probability and the Rules of Probability			
Understand independence and conditional probability and use them to interpret data.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
	CT.9-12.4.C.3.a.(1) Determine outcomes and solve problems involving the probabilities of events.		
Statistics and Probability			
Using Probability to Make Decisions			
Calculate expected values and use them to solve problems.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.S.MD.1 (+) Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.	**CT.9-12.4.E.3.b.(4)** Use relative frequency and expected values to represent and solve problems involving uncertainty. **CT.9-12.4.C.3.a.(1)** Determine outcomes and solve problems involving the probabilities of events.		Graphing probability distributions is not assessed on CAPT.
CC.9-12.S.MD.2 (+) Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.	**CT.9-12.4.E.3.b.(4)** Use relative frequency and expected values to represent and solve problems involving uncertainty.		
CC.9-12.S.MD.3 (+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five	**CT.9-12.4.E.3.b.(4)** Use relative frequency and expected values to represent and solve problems involving uncertainty. **CT.9-12.4.C.3.a.(3)** Apply theoretical and experimental probabilities appropriately to solve problems and predict experimental results.		Developing probability distributions is not assessed on CAPT.

Statistics and Probability			
Using Probability to Make Decisions			
Calculate expected values and use them to solve problems.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes.	**CT.9-12.4.C.3.a.(1)** Determine outcomes and solve problems involving the probabilities of events.		
CC.9-12.S.MD.4 (+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. For example, find a current data distribution on the number of TV sets per household in the United States, and calculate the expected number of sets per household. How many T V sets would you expect to find in 100 randomly selected households?	**CT.9-12.4.E.3.b.(4)** Use relative frequency and expected values to represent and solve problems involving uncertainty. **CT.9-12.4.C.3.a.(1)** Determine outcomes and solve problems involving the probabilities of events.		Developing probability distributions is not assessed on CAPT.
Use probability to evaluate outcomes of decisions.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.S.MD.5 (+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values.	**CT.9-12.4.E.3.b.(4)** Use relative frequency and expected values to represent and solve problems involving uncertainty. **CT.9-12.4.C.3.a.(1)** Determine outcomes and solve problems involving the probabilities of events.		Assigning probabilities and finding expected values are not specified in the CT standards and are not assessed on CAPT.

Statistics and Probability			
Using Probability to Make Decisions			
Use probability to evaluate outcomes of decisions.			
CCSS	**CT Standard Match**	**CT Assessment**	**Notes**
CC.9-12.S.MD.5a Find the expected payoff for a game of chance: For example, find the expected winnings from a state lottery ticket or a game at a fast-food restaurant.	**CT.9-12.4.E.3.b.(4)** Use relative frequency and expected values to represent and solve problems involving uncertainty. **CT.9-12.4.C.3.a.(1)** Determine outcomes and solve problems involving the probabilities of events.	**CT.9-12.4.C.3.a.(1)** Determine outcomes and solve problems involving the probabilities of events.	
CC.9-12.S.MD.5b Evaluate and compare strategies on the basis of expected values: For example, compare a high-deductible versus a low- deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.	**CT.9-12.4.E.3.b.(4)** Use relative frequency and expected values to represent and solve problems involving uncertainty. **CT.9-12.4.C.3.a.(1)** Determine outcomes and solve problems involving the probabilities of events.	**CT.9-12.4.C.3.a.(1)** Determine outcomes and solve problems involving the probabilities of events.	
CC.9-12.S.MD.6 (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).	**CT.9-12.4.C.3.a.(1)** Determine outcomes and solve problems involving the probabilities of events.	**CT.9-12.4.C.3.a.(1)** Determine outcomes and solve problems involving the probabilities of events.	
CC.9-12.S.MD.7 (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).	**CT.9-12.4.C.3.a.(1)** Determine outcomes and solve problems involving the probabilities of events.	**CT.9-12.4.C.3.a.(1)** Determine outcomes and solve problems involving the probabilities of events.	